Pheromone traps are a critical tool for the early detection and monitoring of insect pests. This publication provides basic information regarding the use of pheromone traps, which are suitable for conventional and organic crop producers.

**Insect Pheromones and Their Use in Pest Management**

Pheromones are produced naturally by a variety of animals, and they serve as chemical messengers. Insect pheromones are synthesized inside the body of insects and released in small amounts by specific organs. Pheromones are of various types and functions. For example, aggregation pheromones cause insects to come together on a host (bark beetles) and trail pheromones mark foraging pathways (ants). Some pheromones regulate reproductive behavior (honey bees), and sex pheromones attract mates of the same species (many moths).

Sex pheromones are released slowly over extended periods and are active at limited distances from the source. Despite numerous odors that may be present in the surrounding air at any given time, insects are able to detect pheromones using their highly specialized antennae. Many nocturnal moths have extremely bushy antennae for detecting trace amounts of pheromones.

Pheromone traps can be used in many ways—for detecting insects early in the season, for season-long monitoring of pest abundance, or for attracting insects away from main crops (mass trapping with an insecticide bait). Several manufacturers produce synthetic versions of sex pheromones that can be used in durable traps to determine insect activity and seasonal abundance.

**Figure 1.** Monitor insect pests with pheromone traps.

**Why Use Insect Traps?**

The first step to integrated pest management (IPM) is the timely detection of a pest infestation. Insect traps not only allow detection and monitoring of pest activity but also provide estimates regarding pest population density in the sample area. If pests are monitored consistently over multiple years, pheromone traps can indicate critical changes in population dynamics and behavior of pests.
In commercial agriculture, commonly used monitoring traps (figures 2 and 3) use natural insect mobility to lure insects into the traps by using pheromones (scents), shape, or color. Effective deployment and routine checks can provide information for understanding pest pressures and correctly time the insecticidal treatments that may increase crop yields. Although trap catch numbers for a given species can be used to determine an increased probability of an economic infestation, trap catch thresholds alone may not be adequate for making treatment decisions in row crops. The trapped field must be scouted to ensure that moths are laying eggs in the field and that a sufficient number of immature insects are surviving to cause economic losses.

Wing pheromone traps (figure 1) are popular among crop producers and have been tested for efficacy in Alabama. Once you purchase a kit that comes with plastic tops and assembly materials, you only need to buy fresh lures and trap bottoms from year to year (a negligible cost compared to expensive insecticides). Product assembly and maintenance are very easy. Store the unopened lures in a cool dark place, and they will be usable for a long time. Remember that the accuracy of traps depends on their number and correct deployment in the field.

**Common Types and Sizes of Traps**

Wing pheromone traps (figure 2) are suitable for monitoring the small- or medium-sized moths. Due to the limited size of the stick bottom, wing traps need weekly checking (called servicing) to replace the lure. Bucket traps (figure 3) are expensive and bulky; however, they can be used for collecting a large number of moths.

**Basic Parts of a Wing Pheromone Trap**

Wing traps are low-cost devices that are well suited to resist strong winds because of their open structure. They do, however, need frequent servicing to maintain effectiveness.

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**Top section**

Plastic pheromone traps last longer than paper traps. The top part of the trap is the nonsticky portion of a wing trap. Once assembled, this top portion doesn’t need servicing for a season unless damaged by inclement weather or other causes. Steel wire or a plastic tie can be used to suspend the top of the trap from a wooden or metal support above the crop canopy, or traps (e.g., boll weevil traps) may be installed at field margins. You can put information such as setup date, location, and GPS coordinates under the top section and maintain separate records in your scouting book.

**Bottom section**

The bottom portion of a wing trap needs regular maintenance because of the open design and small trapping area. The square grid on the sticky surface is designed to assist in estimating the number of insects during periods of high trap catches. In delta traps or triangular traps, the sticky bottom is postcard-sized and is more easily replaced than wing trap bottoms. Write the location and sampling date and time on the sticky bottom during servicing. Trap bottoms can be stored for a long time in resealable plastic bags if sealed properly.
Monitoring Insect Populations Using Traps

One of the major advantages of using insect pheromone traps with a lure is that they are designed to attract a single species of insect. Other flying insects may accidentally visit the trap, but their numbers will be lower than the target pest. Therefore, insect identification is automatic, and trap data can significantly improve field scouting. Most manufacturers provide brochures with information about trap assembly and placement, replacement of the sticky bottom, identification of the target insect, and record keeping. If you wish to monitor several insect species, separate each trap by at least 150 feet.

Remember that monitoring traps does NOT provide information about real crop injury, and this fact makes field scouting an indispensible tool for the progressive grower. Only in some cases can insect pest numbers from pheromone traps be used for supporting treatment decisions. For example, if tomato fruitworm moth numbers exceed seven per trap during fruit formation, then scouting should be intensified for eggs and caterpillars on the actual crop.

Suppliers of Insect Pheromone Lures and Traps/Trap Kits

Below are a few major suppliers of insect pheromones for crop producers.

**Direct from manufacturers:**
- Scentry Biologicals, Montana (1-800-735-5323)
- Trece, Inc., Oklahoma (1-866-785-1313)

**For bulk purchases:**
- Great Lakes IPM, Michigan (1-800-235-0285)
- Arbico Organics, Arizona (1-800-827-2847)

Check with multiple companies to compare rates and get supplies in adequate quantities. Some suppliers (for example, Arbico Organics) may provide economical starter kits that you can purchase to gain experience in correct deployment and servicing of the traps. Purchase lures early in the week so they can be shipped to you without delay.
A Special Note for Organic Crop Producers

Use of pheromone traps provides information for developing site-specific integrated pest management plans. While the conventional crop producers have many insecticidal control options that allow some flexibility in application times, organic crop producers have to depend on pest prevention tactics such as pest tolerant varieties, intercropping, trap cropping, etc. Pheromone traps can be used to effectively monitor long-term pest prevention strategies in a cost effective manner.

Maintenance Tips for Insect Traps

- Replace lures once every week. Check more frequently immediately after inclement weather. Follow product guidelines for trap maintenance.
- Always wear disposable, powder-free latex gloves when handling lures. Change gloves frequently between various lures.
- Place the traps on field edges and mark location with tall flags to increase their visibility to farm workers.
- Avoid hanging pheromone traps in areas with high bird or animal activity to minimize disturbance. In rare instances, birds and other small animals can accidentally get trapped in wing traps.
- Keep detailed records of insect numbers in traps. Accuracy of insect traps increases with the number of traps deployed across the field.
- Scout crops directly for determining direct crop injury.

Ayanava Majumdar, Extension Entomologist, and Timothy Reed, Extension Specialist, Agronomic Crops, both with Auburn University

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